

**What Is Claimed Is:**

1           1.       A method for validating a resource record in a cache, comprising:  
2           retrieving the resource record at a client;  
3           issuing one or more queries for the resource record;  
4           waiting for a response to the query; and  
5           if the response to the query is not received in a pre-determined amount of  
6           time, invalidating the resource record.

1           2.       The method of claim 1, wherein the response to the query is a  
2           multicast response, thereby allowing other clients to update corresponding copies  
3           of the resource records without querying the device, thus saving network  
4           bandwidth.

1           3.       The method of claim 1, further comprising:  
2           receiving a multicast message from a second client querying a second  
3           device;  
4           locating a second resource record associated with the second device;  
5           waiting for a multicast response to the multicast query; and  
6           if after a pre-determined number of queries the multicast response to the  
7           multicast query is not received in the pre-determined amount of time, invalidating  
8           the second resource record.

1           4.       The method of claim 1, wherein invalidating the resource record  
2           further comprises invalidating a child record of the resource record.

1           5.       The method of claim 1, wherein if the response to the query is not  
2 received in a pre-determined amount of time, the method further comprises:  
3           retrieving a parent record of the resource record at the client, wherein the  
4 parent record refers to the resource record;  
5           issuing a query for the parent record;  
6           waiting for a response to the query from the device; and  
7           if the response to the query is not received in a pre-determined amount of  
8 time, invalidating the parent record, and then repeating the above process by  
9 applying it recursively to any records that refer to the now-invalidated parent  
10 record.

1           6.       The method of claim 1, wherein if the response to the query is not  
2 received in a pre-determined amount of time, the method further comprises:  
3           retrieving a parent record of the resource record at the client, wherein the  
4 parent record refers to the resource record;  
5           issuing a query for the parent record;  
6           receiving a response to the query from the device, wherein the response  
7 includes information for updating the resource record; and  
8           updating the resource record with the information received in the response.

1           7.       The method of claim 6, wherein the method further comprises  
2 updating the parent record with the information received in the response.

1           8.       The method of claim 1, wherein the method is invoked at a pre-  
2 specified time interval.

1           9.     A computer-readable storage medium storing instructions that  
2     when executed by a computer cause the computer to perform a method for  
3     validating a resource record in a cache, the method comprising:  
4             retrieving the resource record at a client;  
5             issuing one or more queries for the resource record;  
6             waiting for a response to the query; and  
7             if the response to the query is not received in a pre-determined amount of  
8     time, invalidating the resource record.

1           10.    The computer-readable storage medium of claim 9, wherein the  
2     response to the query is a multicast response, thereby allowing other clients to  
3     update corresponding copies of the resource records without querying the device,  
4     thus saving network bandwidth.

1           11.    The computer-readable storage medium of claim 9, wherein the  
2     method further comprises:  
3             receiving a multicast message from a second client querying a second  
4     device;  
5             locating a second resource record associated with the second device;  
6             waiting for a multicast response to the multicast query; and  
7             if after a pre-determined number of queries the multicast response to the  
8     multicast query is not received in the pre-determined amount of time, invalidating  
9     the second resource record.

1           12.    The computer-readable storage medium of claim 9, wherein  
2     invalidating the resource record further comprises invalidating a child record of  
3     the resource record.

1           13.     The computer-readable storage medium of claim 9, wherein if the  
2 response to the query is not received in a pre-determined amount of time, the  
3 method further comprises:  
4           retrieving a parent record of the resource record at the client, wherein the  
5 parent record refers to the resource record;  
6           issuing a query for the parent record;  
7           waiting for a response to the query from the device; and  
8           if the response to the query is not received in a pre-determined amount of  
9 time, invalidating the parent record, and then repeating the above process by  
10 applying it recursively to any records that refer to the now-invalidated parent  
11 record.

1           14.     The computer-readable storage medium of claim 9, wherein if the  
2 response to the query is not received in a pre-determined amount of time, the  
3 method further comprises:  
4           retrieving a parent record of the resource record at the client, wherein the  
5 parent record refers to the resource record;  
6           issuing a query for the parent record;  
7           receiving a response to the query from the device, wherein the response  
8 includes information for updating the resource record; and  
9           updating the resource record with the information received in the response.

1           15.     The computer-readable storage medium of claim 14, wherein the  
2 method further comprises updating the parent record with the information  
3 received in the response.

1           16.    The computer-readable storage medium of claim 9, wherein the  
2 method is invoked at a pre-specified time interval.

1           17.    An apparatus that validates a resource record in a cache,  
2 comprising:  
3           a retrieval mechanism at a client configured to retrieve the resource record;  
4 and  
5           an invalidation mechanism configured to,  
6                    issue one or more queries for the resource record,  
7                    wait for a response to the query, and  
8                    if the response to the query is not received in a pre-  
9                    determined amount of time, to invalidate the resource record.

1           18.    The apparatus of claim 17, wherein the response to the query is a  
2 multicast response, thereby allowing other clients to update corresponding copies  
3 of the resource records without querying the device, thus saving network  
4 bandwidth.

1           19.    The apparatus of claim 17, wherein the invalidation mechanism is  
2 configured to:  
3           receive a multicast message from a second client querying a second  
4 device;  
5           locate a second resource record associated with the second device;  
6           wait for a multicast response to the multicast query; and  
7           if after a pre-determined number of queries the multicast response to the  
8 multicast query is not received in the pre-determined amount of time, to invalidate  
9 the second resource record.

1           20.    The apparatus of claim 17, wherein invalidating the resource  
2 record further comprises invalidating a child record of the resource record.

1           21.    The apparatus of claim 17, wherein if the response to the query is  
2 not received in a pre-determined amount of time, the invalidation mechanism is  
3 additionally configured to:

4           retrieve a parent record of the resource record at the client, wherein the  
5 parent record refers to the resource record;  
6           issue a query for the parent record;  
7           wait for a response to the query from the device; and  
8           if the response to the query is not received in a pre-determined amount of  
9 time, to invalidate the parent record, and to then repeat the above process by  
10 applying it recursively to any records that refer to the now-invalidated parent  
11 record.

1           22.    The apparatus of claim 17, further comprising an updating  
2 mechanism, wherein if the response to the query is not received in a pre-  
3 determined amount of time, the updating mechanism is configured to:

4           retrieve a parent record of the resource record at the client, wherein the  
5 parent record refers to the resource record;  
6           issue a query for the parent record;  
7           receive a response to the query from the device, wherein the response  
8 includes information for updating the resource record; and to  
9           update the resource record with the information received in the response.

1           23.    The apparatus of claim 22, wherein the updating mechanism is  
2 additionally configured to update the parent record with the information received  
3 in the response.

1           24.    The apparatus of claim 17, wherein the apparatus is invoked at a  
2 pre-specified time interval.